

THE EFFECTS OF NEED TO ACHIEVE, SEX AND FEEDBACK UPON LEARNING

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Chapter I

INTRODUCTION

The foundations of behavioral learning theory, set forth by E.L. Thorndike in the 1930's have greatly influenced the development of educational technology. Thorndike's research on animal and human subjects led to the establishment of the laws of "Effect," "Exercise," and "Recency" (Hilgard and Bower, p.15-25, 1966). These three laws can be described as follows: the "Law of Effect" maintains that responses which are followed by a reward will reoccur more frequently than responses which are followed by punishment; the "Law of Exercise or Frequency" states that responses which are used more often will reoccur more frequently than unused responses; and the "Law of Recency" predicts that in a chain of responses, the last response which is made will reoccur more frequently than the previous responses. The application of these three "Laws" to the testing situation contributed to the development of self-scoring devices and teaching machines (Pressey, 1926).

Pressey, a pioneering educational psychologist, was one of the first people to apply Thorndike's principles of learning in a testing situation. He believed that a testing device based upon Thorndike's "Laws" would enhance the learning process. In 1926 Pressey published his first article describing his newly developed automatic testing device. This automatic testing device was intended

to improve the process of testing, the scoring of examinations and the teaching of students (Pressey, 1926). According to Pressey, the most obvious test format for use in a machine was the multiple-choice format. The teaching and testing device developed by Pressey consisted simply of presenting one question and the alternative answers in a machine similar to a typewriter. A student was to press a lever corresponding to his/her desired answer. If the student's answer was correct, the machine would provide feedback by automatically moving on to the next question. If, however, a student selected the wrong answer, the next question did not appear and the student was instructed to select another answer. When the correct answer was finally selected, the next question on the test came into view. Also, the testing device indicated the total number of errors a student made during the testing period.

Pressey (1926,1927,1932,1950) stated that the major advantages of a testing device were that it: 1) provided immediate total feedback, 2) provided an interesting way of learning and 3) freed teachers from the mechanical tasks of scoring papers.

After the initial construction of a simple testing and feedback device, Pressey continued to build other devices to aid in the testing/learning process (Pressey, 1927,1932,1950). These devices included a punchboard, a double-stencil answer sheet and an improved version of his original machine. Peterson (1960), a student of Pressey, devised a chemically treated answer sheet to provide feedback on multiple-choice tests. Little (1934) constructed an automatic scoring machine similar to Pressey's device. However, unlike Pressey's device, Little's machine provided only partial feedback to students. All of these devices used multiple-choice test formats and were designed to provide students

with immediate feedback to their test responses.

STATEMENT OF THE PROBLEM

Since 1926 various teaching and/or testing devices have been used in the classroom to aid learning (Lumsdaine and Glaser, 1960). These testing devices have been used to provide either immediate total or immediate partial feedback on multiple-choice tests. Pressey (1926, 1927, 1932, 1950) and Hanna (1976) have shown that feedback significantly improves learning in a testing situation. Others, however, (Feldusen & Birt, 1962, Hough & Revsin, 1963) failed to show that feedback enhances learning. It is the purpose of this research to determine how the independent variables of feedback conditions, need to achieve and sex affect learning in a testing situation. The dependent variable of learning will be measured by an achievement test.

DEFINITIONS

The following definitions are given to aid in the understanding of concepts and variables used in this study.

1. Achievement motivation/need to achieve--"the striving to increase one's own capability in all activities in which a standard of excellence is thought to apply and where the execution of such activities can, therefore, either succeed or fail" (Heckhausen, 1967).

2. Feedback/knowledge of results--the process of providing information and making students aware of the correctness or incorrectness of an answer. The types of feedback are:

- a. immediate total feedback--informing a student whether his/her answer is correct or incorrect; if incorrect the student is

directed to continue selecting until a correct answer has been selected.

- b. immediate partial feedback--informing the student if his/her answer is correct or incorrect.
 - c. no immediate feedback--not informing the student of the correctness of his/her answer.
3. Teaching/testing devices/self-scoring devices--any apparatus or machine which presents problem material to the students, provides means for the student to respond and immediately indicates the correctness of the solution. Examples are Pressey's punchboard, Skinner's teaching machine and chemically treated answer sheets and pens.

HYPOTHESES TO BE TESTED

Hypothesis 1. Both immediate total feedback and immediate partial feedback will cause better criterion test performance than will no immediate feedback.

Hypothesis 2. Immediate partial feedback will cause better criterion test performance for high need to achieve students than immediate total or no feedback.

Hypothesis 3. Immediate total feedback will cause better criterion test performance for low need to achieve students than immediate partial or no feedback.

LIMITATIONS OF THE STUDY

Pressey (1950) pointed out the difference between different testing contents and the use of a self-scoring device. He found greater amounts of learning to occur when the testing material was novel

to the learner. The current research was conducted with a testing content of knowledge of reference materials. The self-scoring device employed in this study was the 3M Actionmark Paper Response System. Generalizations could only be made concerning similar content difficulty and the use of this specific feedback device.

In all treatment conditions, Herman's Prestatie Motivatie Questionnaire was administered prior to other measures. This measure was given first in order to avoid inducing anxiety in experimental subjects. Therefore, generalizations can only be made concerning the results of the present study when Herman's Prestatie Motivatie Questionnaire is administered prior to feedback or experimental conditions.

SIGNIFICANCE OF THE STUDY

This study was conducted to provide statistical data concerning the effects of sex, need to achieve and feedback conditions upon learning. Self-instructional devices were used to determine the effects of immediate total feedback, immediate partial feedback and no feedback upon learning. Previous research conducted by Hanna (1976) indicated that immediate total and immediate partial feedback significantly affected learning. Other researchers, Feldhausen and Birt (1962) and Hough and Revsin (1963) found that immediate total feedback did not significantly affect learning. These researchers used a variety of devices such as programmed text and teaching machines while Hanna (1976) used self-scoring devices in the testing situation. This study will re-examine the effects of self-scoring devices in a testing situation and will also examine the interaction effects of treatment and need to achieve. Also, the present study will show the effects of feedback

conditions as they relate to the variable of sex. It is expected that immediate total and partial feedback will cause better criterion test performance for male students than no feedback and this difference will not be found among female students.

Chapter II

REVIEW OF LITERATURE

Ammons (1956) conducted a survey of studies concerned with effects of knowledge of performance. Most of the studies reviewed by Ammons dealt with human learning and motor skills. Based on his review of the effects of feedback he made eleven generalizations. Five of his generalizations which are of importance to the present study are:

1. Performers usually have ideas about what they are doing and how they are to do it and these interact with feedback.
2. Knowledge of performance affects motivation usually by increasing it. However, when performance is already high feedback may lead to a decrease in motivation.
3. The more specific the feedback, the faster the improvements and the higher the level of performance.
4. Small temporal intervals between the responses and feedback are generally better for learning than longer ones.
5. For all reasonable purposes, there is some knowledge of performance available to humans.

Regarding his first generalization, Ammons points out that sometimes subjects would form incorrect hypotheses concerning the correctness of their responses. When these incorrect hypotheses interact with feedback, a below optimum performance level can be expected. Poor performance can be caused by feelings of frustration because the subject

is unsuccessful at responding to the correct answer. The interaction of motivation and knowledge of performance (Ammon's second generalization) was studied by Ross (1933). The focus of Ross's study was upon total test feedback rather than upon feedback per item. Ross's study consisted of giving quizzes to three treatment groups and varying the amount of information that each group received concerning their grades. He found no difference among the feedback conditions on quiz performance.

In dealing more directly with verbal learning and immediate feedback, Pressey (1926,1927,1932,1950) developed automatic self-scoring devices for objective tests. The devices were: a punchboard, a double-stencil answer sheet and a self-scoring machine. With the use of these devices, students could receive immediate information about their quiz results. Using the punchboard, Pressey (1950) experimented to determine the effects of immediate feedback versus no feedback with college students. His test content was composed of vocabulary words, psychological words and Russian vocabulary words. He found that students who used the punchboard had fewer errors on the practice tests compared to the students who did not use the punchboard. Pressey (1950) also used the punchboard on practice quizzes in an educational psychology class. He found that students who used the punchboard scored higher on the midterm exam than those who did not use the punchboard. In addition to their utility in the teaching/learning process, Pressey pointed out that punchboards could be time-saving devices for teachers. Punchboard testing could liberate teachers from the laborious task of grading multiple-choice tests.

Angell and Troyer (1948) stated, "in general, techniques

whereby a student gains immediate knowledge of test results aids directly in the realization of a major goal of education: to help the student to increased ability in self-evaluation to identify his own strengths and weakness in such a way that he may direct subsequent learning efforts more intelligently." Angell (1949) used Pressey's punchboard for quiz results in a freshman chemistry class. His study consisted of two groups, an experimental group who used the punchboard and received immediate knowledge of results and a control group who received no knowledge of results. After several quizzes, the experimental group had higher scores on the final exam than the control group. Angell (1949) concluded that:

1. students using the punchboard and receiving immediate feedback did better on the final exam than students with delayed feedback.

2. students receiving immediate feedback did better on application items than on knowledge of fact items.

3. students that used Pressey's punchboard were more likely to regard the quizzes as opportunities for learning than students not using the punchboards.

Hanna (1976) used procedures similar to those of Pressey (1950) and Angell (1949). He used an answering card with a carbon shield covering the choices for each item. The student's erasure on the card uncovered a letter indicating whether or not their answer was correct. While Pressey's subjects were college students, Hanna's subjects were elementary school students. He used achievement questions for his content and his test was in an interpretive exercise format. Hanna (1976) followed Salomon's (1972) preferential aptitude-treatment model. He was interested in the interaction of ability, feedback and sex. Using

achievement as an independent variable, he trichotomized his subjects into groups of high, medium and low achievement. His treatment groups were immediate total feedback, immediate partial feedback and no feedback. Hanna's results indicated that:

1. students receiving immediate total feedback and immediate partial feedback had higher criterion scores than those receiving no feedback.

2. high-achieving students did better under conditions of immediate partial feedback while low-achieving students did better under conditions of immediate total feedback.

3. an unexpected effect was that males, but not females, did better under conditions of immediate total feedback than under other feedback conditions.

Hanna (1976) suggested further research to examine the interaction between immediate total feedback and affective traits such as achievement motivation. Internal consistency of tests which provided immediate total and immediate partial feedback were also examined by Hanna (1977). He found immediate total feedback to yield the largest coefficient alphas.

Paige (1966) conducted similar research concerning the effect of immediate reinforcement on learning. He used the term "reinforcement" synonymously with "feedback." Paige's sample consisted of eighth-grade students and the material to be learned was a new numeration system. Paige concluded that immediate reinforcement has a positive effect upon learning.

Jensen (1949) has carried the use of self-scoring devices into the field of self-paced independent study courses and found that

students receiving immediate total feedback on quizzes had higher semester grades than those who did not receive feedback.

Plowman and Stroud (1942) and Karraker (1967) found that learning occurred under conditions of delayed feedback. Kaess and Zeaman (1960) reported on the positive and negative knowledge of results on the Pressey punchboard. Their conclusion was that learning was an inverse function of the number of distractors in overt responses.

Feldhusen and Birt (1962) examined nine methods of presentation of programmed learning materials. They employed different self-scoring devices such as teaching machines and programmed texts and concluded that feedback, whether total or none, did not effect learning. Hough and Revsin (1963) used a linear selected-response programmed text and combined it with immediate total feedback. They found no significant difference between no feedback and immediate total feedback conditions upon learning. They pointed out that programmed instruction could not be considered to be the same as self-scoring devices, but the amount of information provided such as total, partial or no feedback is similar to that provided by self-scoring devices. Both studies used two percent error rate programs. There have been some studies combining various variables and feedback conditions. Sullivan, Baker and Schultz (1967,1971) combined intrinsic reinforcement, the use of gold stars and grades, and feedback conditions. They found that the no feedback group had higher criterion scores on mastery tests. They studied the effects of immediate feedback in questions inserted in textbooks. Unlike the Sullivan, Baker and Schultz (1967,1971) studies the present study is concerned with feedback for questions in a formal testing situation.

As noted earlier, the need to determine how various affective variables, such as the need to achieve, interact with immediate total, immediate partial or no feedback must be experimentally studied (Hanna, 1976). Need to achieve may interact with feedback conditions to affect learning. Heckhausen (1967) has conducted much study on the need to achieve. He summarized the works of McClelland, Atkinson and French. The classic study, however, of the effects of need to achieve on learning of tasks was conducted by Lowell (1952). His sample consisted of male college students. They were divided into two groups of high and low need to achieve students according to their score on a projective measure of need to achieve. Lowell's measure of learning was performance on two verbal tasks: Scramble Words, an unfamiliar task, and Addition, a familiar task. Lowell's (1952) results showed that performance on the Scramble Word task was not significantly different for high and low need achievers; but high need achievers showed greater improvements over time than low need achievers. On the Addition task, high need achievers were significantly better than low need achievers on speed of performance. He attributed these differences to a greater amount of effort expended by high need achievers. Lowell (1952) concluded that high need achievers show more evidence of learning than low need achievers.

Raffini and Rosemier (1972) conducted studies on the Zeigarnik effect (the tendency to recall incompleted tasks more than completed tasks) and the need to achieve. They attempted to determine if high need achievers would remember more incomplete tasks than complete ones. They found that total and partial feedback was better than no feedback and that females remembered more correct answers than incorrect ones.

Incomplete tasks could be compared to partial feedback in the current study and completed tasks could be compared to total feedback conditions.

An important study of the effects of the need to achieve and feedback on learning, if one considers programmed instruction and self-scoring devices to be similar, was conducted by Knight and Sassenrath (1966). They studied the relationship between the need to achieve and performance on programmed instruction. These investigators found that high need achievers learned more using programmed instruction with its accompanying total feedback than did low need achievers.

The hypotheses of the current study were formulated in an effort to develop an individualized treatment for high, medium and low need to achieve students. An extension of Hanna's line of thought seems to suggest that high need achievers' curiosity would be stimulated by partial feedback because the lack of closure would be more appealing and they would attempt a question primarily to determine the correctness of the answer. Low need achievers, on the other hand, would not respond as well to partial feedback because they would accept an answer as wrong without being stimulated to learn more--this would constitute premature closure for them. By providing total closure they would be forced to continue answering the items rather than escaping the correct solution to the problem. It appeared that this study should answer the question of how sex, need to achieve and feedback conditions interact with each other to affect learning.

Chapter III

METHODOLOGY

Identifying the Population

Subjects were students from a junior high school in a medium-sized Kansas school district. A total of 477 students participated in the study. Twenty-two subjects who were absent on one of the two days of data collection were dropped from the analysis. The subjects were conveniently selected from the seventh, eighth and ninth grade levels. Participating subjects were randomly assigned to one of the treatment conditions of immediate total feedback, immediate partial feedback and no feedback. There appeared to have been no factors operating for the students to differ systematically between the treatment groups.

Instruments and Materials

1. Herman's (1970) Prestatie Motivatie Test-Revised by Schultz and Pomerantz (1975) was used to assess the need to achieve. Hermans (1970) reported a reliability coefficient of .82 which was obtained by the use of the Kuder-Richardson 20 formula (K-R 20) for internal consistency. This instrument is a questionnaire with 28 multiple-choice items concerning the need to achieve. The aspects of need to achieve which Herman's instrument measures are: aspiration level, risk-taking behavior, upward mobility, persistence, task-tension, time perception, time perspective, partner-choice, recognition behavior and achievement behavior. These facets of need to achieve were followed from empirical

and theoretical descriptions of the need to achieve (Hermans, 1970). Schultz and Pomerantz (1974,1975) used Herman's instrument with junior high school students and obtained .84 and .91 reliability coefficients using coefficient alpha as a measure of internal consistency. Correlating Herman's instrument with grade point average and The Comprehensive Test of Basic Skills (composite score) they arrived at correlations of .56 and .50 respectively. This need to achieve measure was used to divide the subjects into three groups of low, medium and high achievement motivation.

2. A 20 item multiple-choice test was used as a teaching/testing device. A 22 item completion test was used to measure the amount of learning. The three versions of these tests are presented in Appendix A.

The multiple-choice test was given under three different sets of directions (experimental conditions). The directions were phrased as follows:

a. Immediate Total Feedback directions: For each question in this test, select the one best answer. Then on your separate answer sheet use your crayon to color in the appropriate square of that answer. You will uncover a numeral--"1" means "right"--you have colored the correct answer. Any other numeral--"2," "3," or "4"--means "wrong." If you uncover any numeral other than "1" then try again and continue coloring until the "1" is uncovered. Color as few squares as you can.

b. Immediate Partial Feedback directions: For each question in this test, select the one best answer. Then on your separate answer sheet use your crayon to color in the appropriate square of

that answer. You will uncover a numeral--"1" means you are "right"--you have colored the correct answer. Any other numeral means a "wrong" answer. Therefore, you know whether or not you have answered each question correctly. Color only one square for each question.

c. No Feedback directions: For each question in this test, select the one best answer. Then on your separate answer sheet fill in the circle under the letter of that answer.

3. The testing/teaching device is a 3M Brand Actionmark Paper and Response System. The Actionmark sheet has invisible ink over each answer. The student uses an Actionmark crayon to mark the responses. The reaction between the invisible ink and the crayon reveals the answer.

Procedure

The data collection required two days. The Herman's Prestatie Motivatie Questionnaire was given on the first day. This questionnaire had a time limit of 20 minutes to complete. The questionnaire was administered in individual classrooms to groups of 20 to 30 students. Two examiners administered the questionnaires in different classrooms.

On the second day, the students were administered the multiple-choice tests under one of the experimental conditions. The tests had a time limit of 20 minutes for total feedback, 18 minutes for partial feedback and 15 minutes for no feedback. After the multiple-choice tests, students were given the completion test. This test had a time limit of 15 minutes. Three examiners administered the multiple-choice and completion tests in different classrooms.

On the first day of testing, the students were randomly given answer sheets with the numerals of 1, 2, or 3 which corresponded to

total, partial and no feedback conditions. On the second day the students went to their classrooms and then were told to report to different classrooms depending upon their numeral.

Data Analysis

A $3 \times 3 \times 2$ factorial ANOVA was used to analyze the obtained data and to determine if there was a statistically significant difference among the means of the treatment groups. The independent variables of feedback (three levels: total, partial and none), need to achieve (three levels: low, medium and high) and sex (two levels: male and female) were analyzed for two and three way interaction effects on the criterion measure.

Chapter IV

RESULTS AND DISCUSSION

Table 1 indicates the distribution of the independent variables.

TABLE 1
DISTRIBUTION OF STUDENTS ACCORDING TO INDEPENDENT VARIABLES

Independent Variable	Number
Sex:	
Female	212
Male	210
	Total 422
Treatment Conditions:	
Immediate Total Feedback	131
Immediate Partial Feedback	135
No Feedback	156
	Total 422
Need to Achieve:	
Low	142
Medium	135
High	145
	Total 422

Subjects for sex, need to achieve and treatment conditions were almost evenly divided.

The results of a multiple variant design with the three factors of sex, treatment conditions and need to achieve are presented in Table 2. The main effects of sex and feedback were not significant on the criterion test scores. Also, there were no significant interaction effects. The main effect of need to achieve was significant at the .01 probability level. These results led to the rejection of the hypotheses of this study. The interaction of need to achieve, sex and feedback conditions were not statistically significant indicating that high, medium and low need achievers do not score higher on the criterion test because of different types of feedback.

TABLE 2
THREE-WAY ANOVA OF CRITERION TEST SCORES

Source	df	MS	F
<u>MAIN EFFECTS</u>			
Sex	1	3.60	0.28
Feedback	2	19.21	1.51
Need to Achieve	2	463.20	36.42*
<u>INTERACTION EFFECTS</u>			
Sex X Feedback	2	8.00	0.63
Sex X Need to Achieve	2	2.37	0.19
Feedback X Need to Achieve	4	11.43	0.90
Sex X Feedback X Need to Achieve	4	17.58	1.38
<u>RESIDUAL</u>	404	12.72	

*Significant at .01 level.

A post-hoc test of Fisher's Least Significant Difference on the need to achieve group means is presented in Table 3.

TABLE 3

FISHER'S LEAST SIGNIFICANT DIFFERENCES ON NEED TO ACHIEVE GROUP MEANS

Comparison of the Need to Achieve Groups		Difference	Standard Error	LSD
Low	Medium	-1.49	0.44	0.87*
Low	High	-3.64	0.43	0.84*
Medium	High	-2.15	0.44	0.86*

*Significant at .05 level

Table 3 indicates that each need to achieve group is significantly different from each other group. A summary of the means and standard deviations of the need to achieve groups on the criterion test scores are shown in Table 4. High need to achieve subjects did better on the criterion test than low or medium need to achieve subjects. In addition, medium need to achieve subjects did better than low need to achieve subjects on the criterion test.

TABLE 4

MEANS AND STANDARD DEVIATIONS OF NEED TO ACHIEVE GROUPS
ON CRITERION TEST

Need to Achieve Group	N	Mean	Standard Deviation
Low	142	8.46	3.63
Medium	135	9.96	3.71
High	145	12.10	3.64

Although the main effects of sex and treatment conditions were not significant, Tables 5 and 6 present a summary of these main effects means and standard deviations on the criterion test. Table 5 indicates that the group receiving immediate partial feedback obtained the lowest score on the criterion test. Also, Hanna (1976) found that the immediate total feedback group had the higher mean score on the criterion test.

Table 6 shows that females had a slightly higher mean score than males on the criterion test.

TABLE 5
MEANS AND STANDARD DEVIATIONS OF FEEDBACK GROUPS
ON CRITERION TEST

Feedback Group	N	Mean	Standard Deviation
Immediate Total Feedback	131	10.39	3.72
Immediate Partial Feedback	135	9.73	3.62
No Feedback	156	10.39	3.61

TABLE 6
MEANS AND STANDARD DEVIATIONS OF SEX
ON CRITERION TEST

Sex	N	Mean	Standard Deviation
Female	212	10.27	3.62
Male	210	10.08	3.71

The time limit set for Herman's Prestatie Motivatie Questionnaire enabled all subjects to finish. The time limits set for the multiple-choice tests enabled all but one subject to finish, while all subjects had ample time for the completion test.

Chapter V

SUMMARY AND CONCLUSIONS

This study was conducted to determine the effects of sex, need to achieve and feedback conditions upon learning. A review of the literature does not provide conclusive evidence concerning the effects of feedback. The major hypotheses of the current study concerned the interaction effects of the independent variables. Hanna (1976) found significant interaction effects between sex, achievement and feedback conditions. Since Hanna's content, sample and test format were very specific, his generalizations can not be considered to apply to all learning situations.

Most of the research using self-scoring devices indicated that feedback affects learning. This research was concerned with the question of the amount of feedback being total, partial or none. The immediacy of feedback was not dealt with in this study.

Hypothesis one was rejected and the conclusion of this study was that neither total, partial nor no feedback significantly affects the testing/learning process. Therefore the findings of the current study can only reinforce those studies which found that the amount of feedback given does not influence the learning process. To speculate why these findings occurred it becomes useful to consider Ammon's (1956) fifth conclusion: for all reasonable purposes, there is some knowledge of performance available to humans. Ross (1933) found

that students who had no objective knowledge of results on test scores did have personal impressions of what their score was on an examination. The correlation of the estimated score and the objective score was .71. Also, Ross (1933) pointed out that the transference between the real classroom and the experimental setting may be different for each subject. In the classroom, grades are a status symbol and are important to students. Evidently, they know their performance scores on exams whether or not they are informed of them. On the other hand, individuals may not consider knowledge of performance to be of great importance in a research experiment. It appears that a combination of these factors may result in a lack of significant effects of feedback upon learning. These points should be kept in mind by future researchers dealing with the topic of feedback conditions.

This study indicated that high, medium and low need achievers do not learn the use of reference materials any better with different feedback testing conditions. The main effect of need to achieve, however, was significant. High need achievers scored higher on the criterion test than medium or low need achievers. Medium need achievers scored higher on the criterion test than low need achievers. These findings are supported by Lowell (1952). It should be remembered that the findings of the present study may only be applied to this type of testing/learning situation.

This is one of the first studies to deal experimentally with the variables of sex, feedback conditions and the need to achieve. Future research should consider other variables, such as internal and external locus of control and their interaction effects with feedback conditions. The possibility that individuals with an external locus

of control may need extensive feedback in the learning process is logical. Although this hypothesis is merely speculative, the need exists for research in this area.

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APPENDIX A

I am doing some research on how to make better tests. By cooperating, you will help me find answers to important questions. However, your help is entirely voluntary. If you decide not to participate in this research, then please just sit quietly and do not answer the questions. You should skip any questions that you feel unduly invade your privacy or that are in any way offensive to you. Confidentiality is guaranteed; your name will not be associated with your answers in any public or private report of the research results. In fact, you are not to put your name on the answer sheet. Are there any questions? If, after participation in the study, you have additional questions, please feel free to ask them.

Directions. For each numbered statement, select the one response which best describes you. Then on your separate answer sheet fill in the circle that has the same letter as the response you have chosen. Please complete every statement.

1. Work is something:
 - A. I would rather not do.
 - B. I don't like doing very much.
 - C. I would rather do now and then.
 - D. I like doing.
 - E. I like doing very much.
2. At school they think I:
 - A. work very hard.
 - B. am diligent.
 - C. am not always so diligent.
 - D. am rather easy-going.
 - E. am very easy-going.
3. I would find a life in which one wouldn't have to work at all:
 - A. ideal.
 - B. very pleasant.
 - C. pleasant.
 - D. unpleasant.
 - E. very unpleasant.
4. To spend a lot of time getting ready for something important:
 - A. really is senseless.
 - B. often is rather silly.
 - C. can often be useful.
 - D. makes a lot of sense.
 - E. is necessary to succeed.
5. When I am working, the demands I make upon myself are:
 - A. very high.
 - B. high.
 - C. not so high.
 - D. low.
 - E. very low.
6. When the teacher gives lessons:
 - A. I usually set my heart on doing my best and making a favorable impression.
 - B. I usually pay great attention to the things being said.
 - C. my thoughts often strayed to other things.
 - D. I am more interested in things that had nothing to do with school.

7. I usually do:
 - A. much more than I decided to do.
 - B. a bit more than I decided to do.
 - C. a little less than I decided to do.
 - D. much less than I decided to do.
8. If I have not reached my goal and have not done a task well then:
 - A. I continue to do my best to reach the goal.
 - B. I exert myself once again to reach the goal.
 - C. I find it difficult to try one more time.
 - D. I'm inclined to give up.
 - E. I usually give up.
9. In school I think not giving up on a task is:
 - A. very unimportant.
 - B. unimportant.
 - C. important.
 - D. very important.
10. To start doing homework is:
 - A. a very great effort.
 - B. a great effort.
 - C. a rather great effort.
 - D. not much effort.
 - E. very little effort.
11. When I am in school the standards I set myself with regard to my studies are:
 - A. very high.
 - B. high.
 - C. average.
 - D. low.
 - E. very low.
12. If I am called from my homework to watch television or listen to the radio, then afterwards:
 - A. I always went straight back to work.
 - B. I would only take a short pause and then go back to work.
 - C. I would always wait a little before starting again.
 - D. I would find it very difficult to begin again.
13. Work that requires great responsibility:
 - A. I would like to do very much.
 - B. I would like to do sometimes.
 - C. I would only do if I was paid well.
 - D. I don't think I would be capable of doing.
 - E. is completely unattractive to me.
14. Other people think I:
 - A. work very hard.
 - B. work hard.
 - C. work pretty hard.
 - D. don't work very hard.
 - E. don't work hard.

15. I think that to reach a high position in society is:
A. unimportant.
B. of little importance.
C. not so important.
D. rather important.
E. very important.
16. When doing something difficult:
A. I give up very quickly.
B. I give up quickly.
C. I give up rather quickly.
D. I don't give up too soon.
E. I usually see it through.
17. In general I:
A. plan for the future very often.
B. plan for the future often.
C. don't plan for the future often.
D. hardly ever plan for the future.
18. In school I find classmates who studied very hard:
A. very nice.
B. nice.
C. just as nice as others who didn't work as hard.
D. not nice.
E. not nice at all.
19. In school I admire persons who reach a very high position in life:
A. very much.
B. much.
C. little.
D. not at all.
20. When I want to do something just for the fun of it:
A. I usually have no time.
B. I often have no time.
C. I sometimes have too little time.
D. I usually have enough time.
E. I always have time.
21. I usually am:
A. very busy.
B. busy.
C. not so busy.
D. not busy.
E. not busy at all.
22. I can work at something without getting tired for:
A. a very long time.
B. a long time.
C. not too long a time.
D. only a short time.
E. only a very short time.

23. Good relations with my teachers at school:
A. are appreciated very much.
B. are appreciated.
C. are thought not to be so important.
D. are thought exaggerated in value.
E. are thought completely unimportant.
24. Boys succeed their father as manager of the business because:
A. they want to enlarge and extend the business.
B. they are lucky their father is manager.
C. they can put their new views into practice.
D. this is the easiest way to earn a lot of money.
25. In school I am:
A. extremely eager.
B. very eager.
C. not so eager.
D. a little eager.
E. hardly eager at all.
26. Organizing is something:
A. I like doing very much.
B. I like doing.
C. I don't like doing very much.
D. I don't like doing at all.
27. When I begin something I:
A. never finish it successfully.
B. seldom finish it successfully.
C. sometimes finish it successfully.
D. usually finish it successfully.
E. always finish it successfully.
28. In school I am:
A. very often bored.
B. often bored.
C. sometimes bored.
D. hardly ever bored.
E. never bored.

MULTIPLE-CHOICE TEST
FORM A

Directions. For each question in this test, select the one best answer. Then on your separate answer sheet color the square of that answer. You will uncover a numeral; 1 means "right" you have colored the correct answer. Any other numeral--2, 3, or 4 means "wrong." If you uncover any numeral other than 1, they try again and continue coloring until the 1 is uncovered. Color as few squares as you can. You will have twenty minutes for this test.

Example

1. Where in a mathematics textbook would you look to find a table of squares and square roots?

A. glossary
B. bibliography
C. appendix
D. preface

Let's see what happens when you make a mistake. If you thought the answer was glossary, you would color the square under the letter A. Color it now. The numeral you see is 4. That is not 1, so you have to try again. Next, if you decided the answer was appendix you would color the square under the C. Color it now. The numeral you see is 1, so you have colored the right answer. You are then finished with this question. Are there any questions?

2. In which reference source would you look to find the uses of cotton?

A. atlas
B. encyclopedia
C. Who's Who in America
D. dictionary

You know the uses of cotton would be in an encyclopedia. So you would color the square under the B. Color it now. The numeral you see is 1. This indicates that you have answered the question correctly. You therefore should not color any other squares. Are there any questions?

When you color, be careful to stay in the one square you are coloring. Do not let your crayon get into other nearby squares.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

MULTIPLE-CHOICE TEST
FORM B

Directions: For each question in this test, select the one best answer. Then on your separate answer sheet color the square of that answer. You will uncover a numeral; 1 means "right" you have colored the correct answer. Any other numeral--2, 3, or 4 means "wrong." Therefore, you know whether or not you have answered each question correctly. Color only one square for each question. You will have eighteen minutes for this test.

Example

1. Where in a mathematics textbook would you look to find a table of squares and square roots?
- A. glossary
 - B. bibliography
 - C. appendix
 - D. preface

Let's see what happens when you make a mistake. If you thought the answer was glossary, you would color the square under the letter A. Color it now. The numeral you see is 4. That is not 1 so you have missed the question. Are there any questions?

2. In which reference source would you look to find the uses of cotton?
- A. atlas
 - B. encyclopedia
 - C. Who's Who in America
 - D. dictionary

You know the uses of cotton would be in an encyclopedia. So you would color the square under the letter B. Color it now. The numeral you see is 1. This indicates that you have answered the question correctly. Are there any questions?

When you color, be careful to stay in the one square you are coloring. Do not let your crayon get into other nearby squares.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

MULTIPLE-CHOICE TEST
FORM C

Directions: For each question in this test, select the one best answer. Then on your separate answer sheet fill in the circle under the letter of that answer. You will have fifteen minutes for this test.

Example

1. Where in a mathematics textbook would you look to find a table of squares and square roots?

A. glossary
B. bibliography
C. appendix
D. preface

Since you would look in an appendix, you would fill in the circle under the C on your answer sheet. Fill it now. Are there any questions?

2. In which reference source would you look to find the uses of cotton?

A. atlas
B. encyclopedia
C. Who's Who in America
D. dictionary

You would look in an encyclopedia. So you would fill in the circle under the B on your answer sheet. Fill it now. Are there any questions?

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

For questions 3-12, which is the best reference source to find:

3. The time zone in which the Panama Canal is located?
 - A. Globe
 - B. Almanac
 - C. Atlas
 - D. Encyclopedia
4. The names of recent Olympic record holders in swimming?
 - A. World Almanac
 - B. Reader's Digest
 - C. Who's Who in America
 - D. Encyclopedia Americana
5. A reference to a recent magazine article about new ideas in education in the U.S.?
 - A. Encyclopedia Americana
 - B. Reader's Guide To Periodical Literature
 - C. Who's Who in America
 - D. World Almanac
6. A detailed description of the Golden Gate Bridge?
 - A. Encyclopedia Americana
 - B. World Almanac
 - C. Goode's World Atlas
 - D. Who's Who in America
7. The most recent figures on coal production in the United States?
 - A. Almanac
 - B. Encyclopedia
 - C. Atlas
 - D. Who's Who in America
8. The latitude and longitude of Flint, Michigan?
 - A. Encyclopedia
 - B. Dictionary
 - C. Atlas
 - D. Almanac
9. The ten highest mountains in the United States?
 - A. Who's Who in America
 - B. Bibliography
 - C. Dictionary
 - D. World Almanac

10. Information about King George III?

- A. Encyclopedia
- B. Who's Who in America
- C. Dictionary
- D. Atlas

11. A short explanation of the discovery and use of plutonium?

- A. Almanac
- B. Who's Who in America
- C. Atlas
- D. Encyclopedia

12. A biographical sketch of George Washington Carver?

- A. American Scientists
- B. Reader's Guide To Periodical Literature
- C. Roget's Thesaurus
- D. Publisher's Weekly

For questions 13-20, select the best reference source.

13. Which of these would be in the reference section of the library?

- A. The Way to Faster Reading
- B. German Reading and Conversation
- C. Reader's Guide to Periodical Literature
- D. Reader's Digest

14. Which of these would probably be a collection of biographies?

- A. Blacks Who Helped Build America
- B. Best Book of the 1960's
- C. Great Inventions of Our Time
- D. Books The World Over

15. Who's Who in America would have information about which of these persons?

- A. Queen Elizabeth II
- B. An Italian Movie Actor
- C. A U.S. Supreme Court Justice
- D. The First Mayor of New York

16. An autobiography is a book about a person's

- A. political beliefs
- B. bio-rhythms
- C. life history
- D. view of someone else's life

17. In which of these books would you look for the names of the United State's living scientists?

- A. Who's Who in America
- B. Book of Facts
- C. Almanac
- D. Atlas

18. In which of these could you most easily find what is meant by a "nocturnal" insect?

- A. How to Work With Nature
- B. Encyclopedia
- C. Garden Pests
- D. Dictionary

19. Which of these would most likely give the birth date of a recent governor of your state?
- A. Dictionary
 - B. A history of your state
 - C. Who's Who in America
 - D. Reader's Digest
20. If you wanted to find a Chinese restaurant in a strange city, which of these would be easiest for you to use?
- A. A book on restaurants
 - B. The reference shelf in the library
 - C. The advertising pages in the telephone directory
 - D. A Sunday newspaper

COMPLETION TEST

Directions. Each question or phrase in this test is to be answered with a word or phrase. Write the answer to each question or phrase on your separate answer sheet.

Examples

1. In which reference source would you look to find out how to spell the word "boomerang?"

In order to know how to spell "boomerang" you should look in a dictionary. Therefore, the word "dictionary" has been written in the space for question 1 on your answer sheet. Are there any questions?

2. In which reference source would you look to learn about the invention of automobiles?

An encyclopedia would give a detailed explanation of the invention of automobiles. Therefore, you should write the word "encyclopedia" in the space for question 2. Write it now. Are there any questions?

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

For questions 3-19, in which reference source will you most likely and easily find:

3. The temperate zone of Agri, India?
4. The number of gold medals won by the swimmer, Mark Spitz in 1974?
5. An American, who won the 1970 Nobel Peace Prize?
6. The name of a country which is located at the 38th degree latitude and 108th degree longitude?
7. How elephants raise their young?
8. The names of journal articles about research conducted in psychology?
9. The history, discoverer and uses of radium?
10. The birth and contributions of A. Barkley, U.S. Vice-President?
11. The 1954 wheat production figures for the U.S.S.R?
12. The height and construction of the Washington National Monument?
13. The names of authors of several magazine articles about new ideas in space travel?
14. What is a wombat?
15. The capital of Norway?
16. The poet laureate for the U.S. in 1965?
17. The name of a U.S. mountain which is 2,000 feet high?
18. What is meant by a monotonic model?
19. The number of articles written, in 1973, by John Allen concerning marriage?

What is the best answer for the following questions?

20. What type of book is The Life and Times of J.C. Calhoun?
21. In what home reference book would you look to find the name and location of a hair styling shop?
22. What type of book is The Best of My Life by Carl Winters?

THE EFFECTS OF SEX, NEED TO ACHIEVE AND FEEDBACK UPON LEARNING

BY

CARL A LONG, JR.

B.A., UNIVERSITY OF RICHMOND, 1973

A THESIS ABSTRACT

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ABSTRACT

Four hundred and twenty-two junior high school students participated in this study of the effects of need to achieve, sex and feedback on multiple-choice tests upon learning. Self-scoring devices were used to provide immediate feedback for each multiple-choice item. The multiple-choice test's content concerned the use of reference materials. Types of feedback were: (1) immediate total feedback wherein the students answered each question until feedback indicated the correct answer, (2) immediate partial feedback in which the students answered each question and feedback indicated the correctness of the one answer attempted per item, and (3) no feedback which was the same as conventional multiple-choice testing.

On the first day of the experiment, subjects were given the Herman's Prestatie Motivatie Questionnaire which was used to divide the subjects into three groups of high, medium and low need to achieve students.

On the second day, students were randomly assigned to one of the experimental treatments with a multiple-choice test. Immediately after taking the multiple-choice test, subjects were given a completion test. Both tests were similar in length, content and difficulty. The completion test served as the criterion test used to measure the amount of learning which occurred.

A 2 X 3 X 3 ANOVA was used to analyze the factors of sex (male and female), need to achieve (high, medium and low) and treatment conditions (total, partial or none). The results of the ANOVA showed

the main effects of sex and feedback conditions not significant. Also, there were no significant interaction effects. The main effect of need to achieve was significant at the .01 probability level. High need to achieve subjects scored significantly higher on the criterion test than medium or low need to achieve subjects. Medium need to achieve subjects scored significantly higher on the criterion test than low need to achieve subjects.

It is recommended that future researchers consider the variables of locus of control and academic aptitude and their interaction effects with different feedback conditions.